



STOCK ASSESSMENT ON SUBDIVISION 3Ps POLLOCK

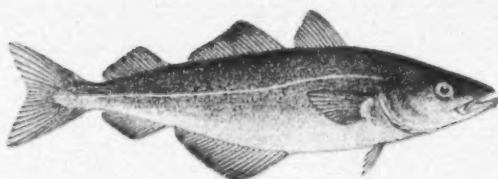


Image: Pollock, (*Pollachius virens*)

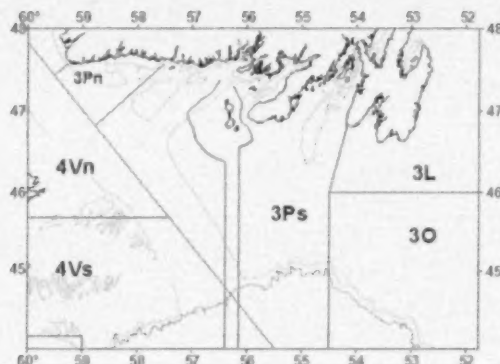


Figure 1. Map of the stock area of Subdivision 3Ps Pollock

Context:

Pollock occur on both sides of the North Atlantic, on the North American side from southern Labrador around Newfoundland into the Gulf of St. Lawrence, and south to Cape Hatteras. Pollock is a member of the Cod family (*Gadidae*), but unlike most gadids they are pelagic in nature spending little time near the bottom. They are voracious eaters and often congregate in large numbers. As pelagic larvae they feed mainly on copepods, but as they settle and move inshore, crustacea, mainly amphipods, are the preferred food. As they increase in size euphausiids, Shrimp and small fish become part of the diet. In the offshore areas Sand Lance, Herring, Silver Hake, Redfish and Lanternfish become more important in the diet.

Pollock prefer waters from 0°C to 10°C however maturation of sex organs and incubation of eggs requires temperatures in the upper range. This places Newfoundland waters at the northern end of the Pollock range. Research on Pollock in the Newfoundland area shows that mature fish occur along the slopes of St. Pierre Bank and the slopes of the southern Grand Bank. In summer months schools of young Pollock are occasionally found in harbours along Newfoundland's south coast. Pollock do not generally occur in Newfoundland waters in sufficient numbers to support a major commercial fishery.

This Science Advisory Report is from the St. John's NL, January 29-30, 2014 Regional Peer Review Stock Assessment of 3Ps and 3LNO Haddock, 3Ps Pollock, and 3Ps American Plaice. Additional publications from this meeting will be posted on the [Fisheries and Oceans Canada \(DFO\) Science Advisory Schedule](#) as they become available.

SUMMARY

- Due to the fact that they are at their northern limit within Subdivision 3Ps, Pollock do not generally occur in Newfoundland waters in sufficient numbers to support a major fishery.
- Pollock distribution within Subdivision 3Ps is restricted mainly to the slope waters of the Burgeo and St. Pierre Banks and inshore waters.
- Pollock in Subdivision 3Ps have been under moratorium since 1993.

- Catches from 1960 to 1992 were highly variable ranging from 300 t to 7500 t. Reported commercial bycatch of Pollock has remained relatively consistent from 1993 to 2013, ranging below 1000 t (except for 1132 t in 2007). In recent years 2009-2013 bycatches were in the range of 500 t.
- Information available is not sufficient to quantitatively assess stock levels and recommend catch options. The semi-pelagic nature and patchy distribution of Pollock in Subdivision 3Ps make it difficult to interpret indices based on bottom trawl surveys.

BACKGROUND

The Pollock fishery in NAFO Subdivision 3Ps has generally been a bycatch fishery since 1991 with the majority of catches being taken in gillnet, longline, and ottertrawl fisheries. Landings of Pollock in the 1960's declined from 4500 t in 1960 when most of the catch was taken by Spain to 187 t in 1969 (Figure 2). Since the extension of jurisdiction catches have been mainly taken by Canada and France (St. Pierre). Catches were generally low from 1967-1982 being less than 1000 t annually. Catches gradually increased after 1982 peaking at 7500 t in 1986 with the entry of the French Metropolitan fleet to the Cod fishery (Figure 2).

During the Subdivision 3Ps groundfish moratorium (1993-1996) bycatches of Pollock declined to pre-1980's levels and were less than 500 t annually (Figure 2). Although Pollock remains under moratorium, the 3Ps Atlantic cod fishery reopened in 1997. Since 1997, bycatch of Pollock increased slightly but was generally (other than 1132 t in 2007) less than 1000 t annually. In recent years (2009-2013) Pollock bycatches were less than 500 t annually (Figure 2).

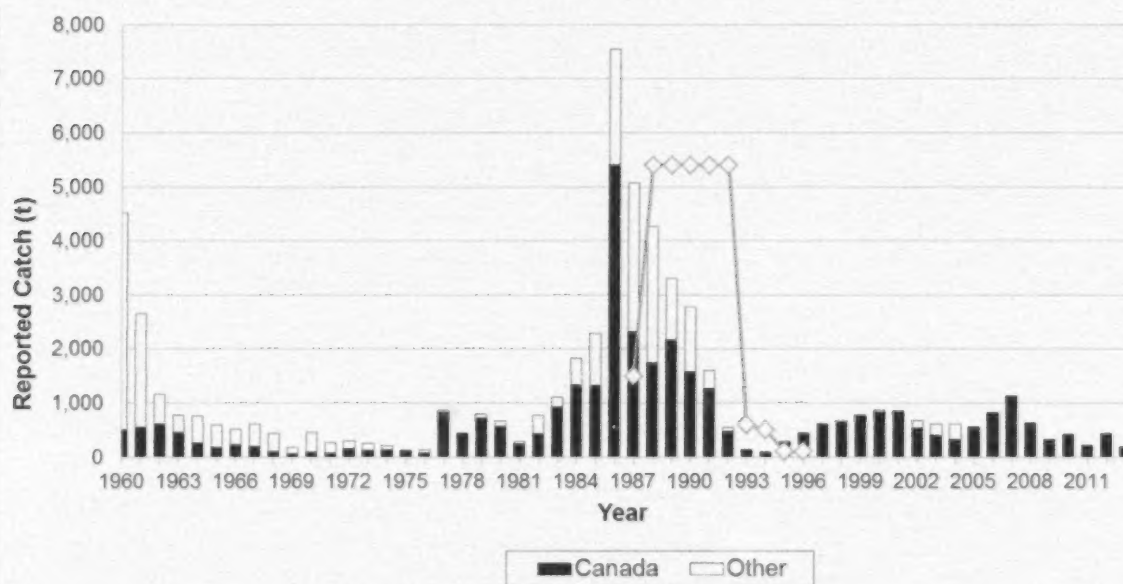


Figure 2: NAFO Subdivision 3Ps Pollock landings and TACs from 1960 to 2013.

ASSESSMENT

Canada has conducted research vessel (RV) surveys in NAFO Subdivision 3Ps using the stratified random design since 1972. Surveys were conducted mainly in February to March prior to 1993 but since then have been conducted in April.

Mean number per tow (abundance) and mean weight per tow (biomass) were used to evaluate stock status. There is no population dynamics model for this stock. Additional information was available from commercial landings.

The use of the research vessel ottertrawl time series as an indicator of stock status is complicated by various vessel and gear changes and the lack of conversion factors. An additional factor is that due to the semi-pelagic nature of Pollock, bottom trawl surveys may not give a reliable index of biomass.

Abundance indices (mean#/tow) for the first time series (Yankee 41.5) were generally low during the early 1970's but showed an increasing trend during the late 1970's and early 1980's (Figure 3). Abundance indices for the second time series (Engel 145) gradually increased during the 1980's to the highest values of the overall time series in 1987 but then indicated a steep decreasing trend towards the mid 1990's (Figure 3). Abundance indices for the Campelen time series increased from the mid 1990's to 2001, declined from 2001 to 2008 and exhibited a variable but generally increasing trend from 2009 to 2013 (Figure 3).

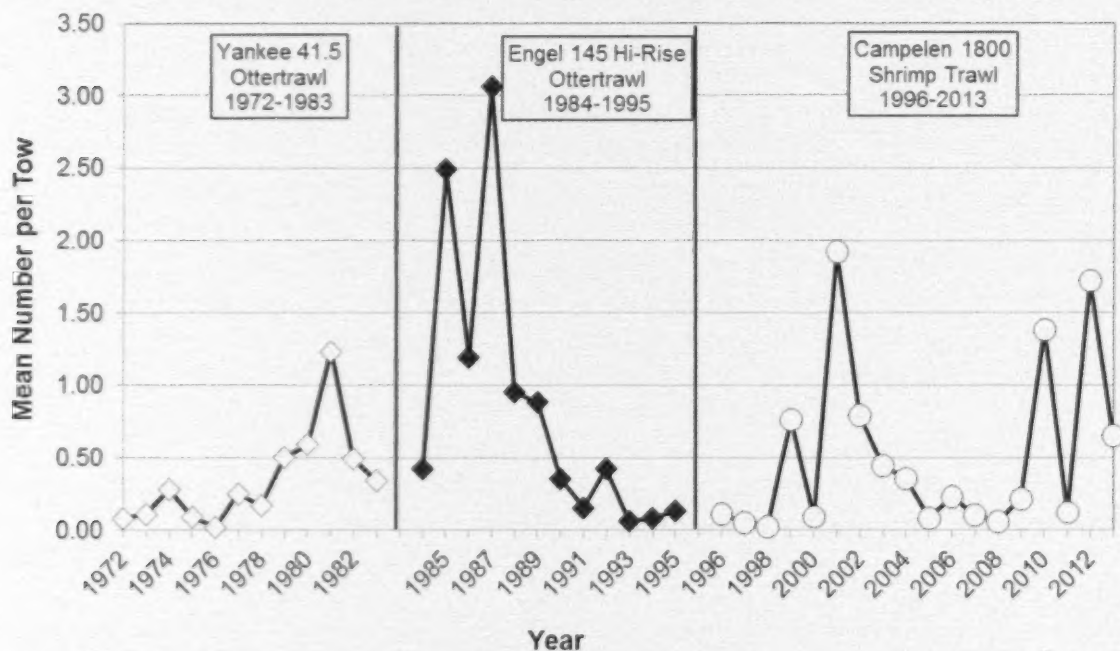


Figure 3: Abundance index for Pollock from winter/spring Canadian RV surveys 1972-2013. Due to a lack of conversion factors the data from the different gear types are not statistically comparable.

Biomass indices (mean weight/tow) for the first time series (Yankee 41.5) were generally low during the early 1970's but showed an increasing trend during the late 1970's and early 1980's (Figure 4). Biomass indices for the second time series (Engel 145) gradually increased during the 1980's to the highest values of the overall time series in 1987 but then indicated a steep decreasing trend towards the mid 1990's (Figure 4). Biomass indices for the Campelen time

series increased from the mid 1990's to 1999, declined steeply in 2000, remained relatively low from 2000 to 2008 and exhibited a variable but generally increasing trend from 2009 to 2013 (Figure 4).

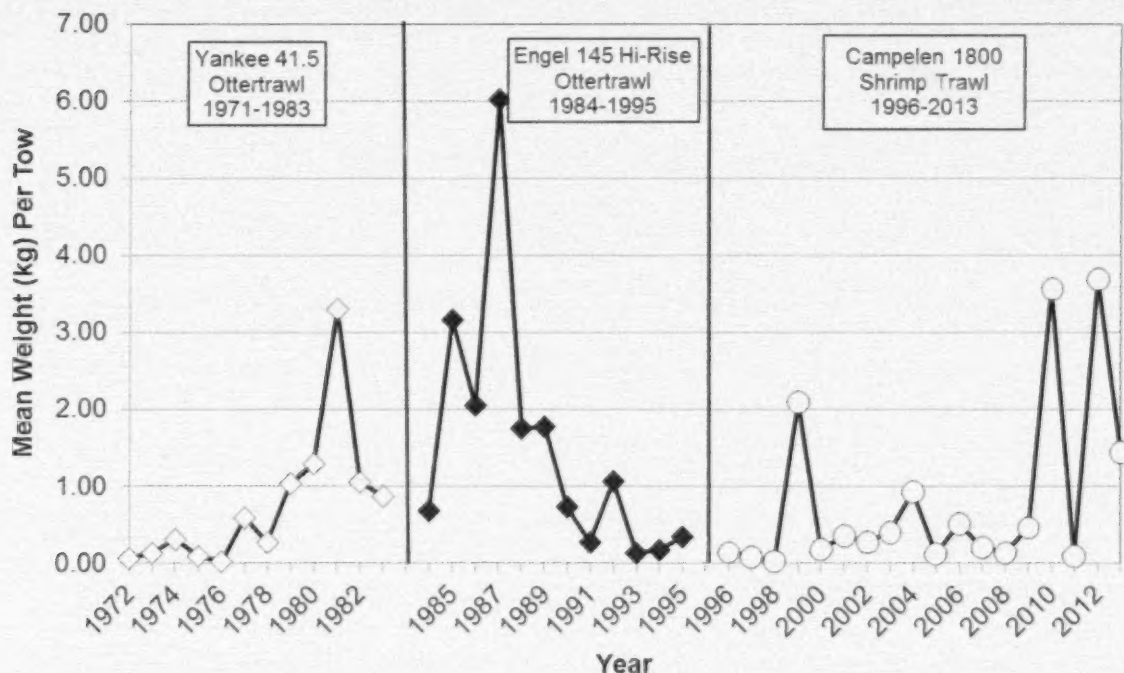


Figure 4: Biomass estimates for Pollock from winter/spring Canadian RV surveys 1972-2013. Due to a lack of conversion factors the data from the different gear types are not statistically comparable.

Ecosystem

There is a clear warming signal in the Subdivision 3Ps region; since the early 1990s, bottom temperature during the spring survey has been increasing at an average rate of around 3 % per year. Although trends of the overall fish community in the 1980s and early 1990s are potentially confounded with changes in the RV survey (e.g. timing of survey, sampling effort, gear change), it seems clear that the overall fish community declined during the mid-1980s and early 1990s. This decline was also accompanied by a decrease in the average fish size. Overall, the biomass and abundance of the fish community has increased since the mid-1990s. Increases in biomass have been moderate, while increases in abundance have been clearer and led by planktivore species like Sandlance, and to a lesser extent Herring.

Changes in biomass/abundance (BA) ratio at the fish community level can be explained by changes in community composition, like recent increases in planktivores. Among piscivores, Atlantic Cod is the dominant species in this functional group. Pollock has shown fluctuations over time, with 2011 and 2013 being relatively strong years compared to all others. During the early 2010s, dominance of Cod seems to be increasing among piscivores, but other gadoids (e.g. Silver Hake) also seem to be increasing within this functional group. Among large benthivores, American Plaice biomass levels have shown very few changes since the mid-1990s. This functional group has been dominated by Thorny Skate and American Plaice. Haddock has shown fluctuation but is not a dominant species among large benthivores. The

observed warming of this system, together with recent increases of "warmer-water" species like Sandlance, Silver Hake, and Pollock suggests that this ecosystem could be undergoing structural changes.

Sources of Uncertainty

The vessels and survey gear used to conduct the survey have changed over time. The A. T. Cameron conducted surveys from 1972-1983 using the Yankee 41.5 ottertrawl. From 1984 to 1995 the Wilfred Templeman or its sister ship the Alfred Needler conducted the survey using the Engel 145 hi-rise ottertrawl. Since 1996 the Wilfred Templeman, Teleost, and Alfred Needler have conducted the survey using the Campelen 1800 shrimp trawl. Conversion factors are not available to convert among the three gear types that were used in the surveys during various periods.

Due to the semi-pelagic nature of Pollock, research vessel (bottom trawl) surveys may not give a reliable index of biomass.

Recent information on growth rates and age at maturity are not available.

At the time of the previous Pollock SAR (DFO 2005) there was some debate with respect to the degree of movement of Pollock between 3Ps and the Scotian shelf stock. A review of NL and Maritimes commercial fisheries data, tagging studies, and research survey data (DFO 2003) concluded that the current boundaries are appropriate and 3Ps Pollock should be managed as a separate population.

CONCLUSION

In light of issues identified with respect to changes in gear over time, and the use of bottom trawl surveys to survey Pollock (a semi-pelagic species) the information available is not sufficient to quantitatively assess stock level and provide catch options at this time.

Pollock have never occurred in NAFO Subdivision 3Ps in large numbers. Their contribution to the groundfish fishery is based on the infrequent occurrence and survival of year-classes against great odds in the extreme north of their range.

Although Pollock remains under moratorium, the 3Ps Atlantic cod fishery reopened in 1997. Reported commercial bycatch of Pollock has remained relatively consistent from 1992 to 2013, ranging below 1000 t (except for 1132 t in 2007).

The influence of recent increases in surface temperatures may result in increased larval survival for a variety of fish species. Increased temperatures could potentially favor warm water species, such as Pollock, potentially leading to changes in community structure.

SOURCES OF INFORMATION

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DFO, 2005. [Stock Assessment on Subdivision 3Ps Pollock](#). DFO Can. Sci. Advis. Sec. Sci. Advis. Rep. 2005/049.

Neilson, J. D., Perley, P., Carruthers, E. H., Stobo, W. and Clark, D. 2003. [Stock Structure of Pollock in NAFO Divs. 4VWX5Zc](#). DFO. Can. Sci. Advis. Sec. Res. Doc. 2003/045.

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ISSN 1919-5087

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Correct Citation for this publication

DFO. 2014. Stock Assessment on Subdivision 3Ps Pollock. DFO. Can. Sci. Advis. Sec. Sci. Advis. Rep. 2014/042.

Aussi disponible en français :

MPO, 2014. Évaluation du stock de goberge dans la sous-division 3Ps. Secr. can. de consult. sci. du MPO, Avis sci. 2014/042.